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The Information Content of GAP

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ABSTRACT

This paper constructs three accounting gap measures and one duration gap measure of the balance sheet structure of banks. To determine the information content of these gap measures, they are used as explanatory variables in a regression model where the dependent variable is either change in net interest income (accounting gaps) or systematic risk (duration gap). The models are estimated using quarterly data for bank holding companies and three size groups of banks for 1984 through 1987. The gap measures fail to provide stable and systematic information about the subsequent behavior of a bank's beta or its change in net interest income.

THE INFORMATION CONTENT OF GAP

The 1980s have witnessed an increased interest in the subject of the interest rate risk exposure of firms. A growth market has developed in creating new market instruments that provide ways for firms to manage their exposure to the unanticipated future movements of interest rates that can decrease firm value or income.

Due to their balance sheet structures depository financial institutions (banks) are thought to be particularly vulnerable to the vagaries of unpredictable movements in interest rates. A large body of literature exists on measuring the degree to which banks are exposed to interest rate risk (see Flannery and James [1984], Giliberto [1988], and Toevs [1983] for example) and suggesting ways for banks to hedge or manage their exposures (see Roll [1987], Bierwag [1987], Bierwag and Toevs [1982], and Morgan, Shome and Smith [1988]). However, in much of this literature a missing element is the specification of a measure which banks can use to assess their exposure to interest rate risk.

Before risk-management techniques can be used effectively, a bank needs to understand the size and direction of its risk exposure. Much of the literature assumes that banks have such a measure of risk exposure at their disposal. The candidate for such a measure is usually a number that reflects the characteristics of the bank's asset and liability maturities, repricings, or durations. These are commonly referred to as gap measures.

The issue under study in this paper is the usefulness of these gap measures. To be useful in constructing risk management strategies, a gap measure should predict, given a hypothesized movement in interest rates, the resulting behavior of some outcome of interest for the bank. In other words, a useful gap measure contains information about the degree of risk exposure.

In Section I below several candidate gap measures are described. These include gap measures that utilize (1) categories of maturity and repricing characteristics of assets and liabilities, (2) weighted average maturities and time to earliest repricing for assets and liabilities, and (3) asset and liability durations. Section II establishes hypotheses to test the usefulness of these gap measures in explaining the subsequent behavior of bank variables such as net interest income or a market measure of risk. Section III presents the data used to construct the gap measures and to determine empirically their information content. In Section IV the empirical results are presented. Section V presents conclusions and possibilities for additional research.

I. GAP MEASURES

If a bank is concerned about the impact of changing interest rates on its flows of interest revenue and interest expense for a certain short period ahead, it may wish to measure the relative dollar amounts of assets and liabilities whose interest revenues and expenses would be affected by a change in rates. The difference between these two dollar amounts will be called AGAP (accounting gap). If, for example, the period of interest is the next three months, then the book value

of all liabilities that mature or could be repriced in the next three months (RSL) is subtracted from the book value of all assets that mature or could be repriced in the same time period (RSA).

$$AGAP = [\sum_i RSA_i] - [\sum_j RSL_j] \quad (1)$$

for assets i = 1, 2, ... m; and liabilities j = 1, 2, ... n. The interpretation of AGAP is straightforward: If interest rates rise and AGAP is positive (negative), a bank's net interest income should rise (fall), ceteris paribus.

AGAP is a simple measure and its interpretation is simple. However, it is also a crude measure in that it ignores the details of the timing of the maturities or repricings during the period. It treats assets or liabilities that may reprice daily equally with assets or liabilities that may reprice only once near the end of the period. An alternative gap measure that adjusts for this imprecision is the weighted gap (WGAP). WGAP measures the difference between the weighted dollar amounts of RSA and RSL where the amount of each rate sensitive asset and liability is weighted by (1-t) where t is the time to first repricing or maturity for each asset or liability. WGAP is defined as:

$$WGAP = [\sum_i RSA_i(1-t_i)] - [\sum_j RSL_j(1-t_j)] \quad (2)$$

The interpretation of WGAP is the same as that for AGAP. Although the data requirements for WGAP are significantly higher than for AGAP, the increased precision in measuring the interest rate sensitivity of assets and liabilities may also be significant.

Regulators, in measuring a bank's exposure to interest rate risk, require that certain deposits with no stated maturity be included in the RSL measure. As rates change, these deposits could be repriced, in the absence of Regulation Q ceilings, and therefore affect interest expense flows. A third accounting gap measure, regulatory gap (RGAP) is also tested in this paper.

AGAP, WGAP, and RGAP focus on the changes in net interest income that should result given a change in interest rates. However, wealth maximizing managers should be concerned with interest rate impacts on bank wealth. As market rates of interest change, market values of fixed rate assets and liabilities change, affecting the market value of a bank's net worth (MVNW). While MVNW is not the same as the market value of equity, there should be a fairly close relationship between these two measures. AGAP, WGAP, and RGAP, by definition, focus on the short term and variable rate assets and liabilities whose market values will change little, if at all, as market rates of interest change. It is in the market values of the (fixed rate) long term assets and liabilities that large changes can occur if rates move significantly. The interest rate sensitivity of an instrument's market value (price) can be captured by the instrument's duration.

By using the durations of a bank's assets and liabilities, a duration gap (DGAP) can be constructed which will provide information on the predicted change in the market value of its net worth for given changes in market interest rates. DGAP is defined as:

$$DGAP = D_a - D_l[L/A][(1+r_a)/(1+r_l)] \qquad (3)$$

where D_a = asset duration, D_l = liability duration, L and A = market value of liabilities and assets, and r_a and r_l = rates of interest on assets and liabilities.

The interpretation of DGAP is also straightforward: If interest rates rise and DGAP is positive (negative), the market value of net worth will fall (rise).

Yet, the question remains, do any of these measures of interest rate risk exposure provide information? Do they correctly indicate the direction (and amount) of the movement in a bank's net interest income (AGAP, WGAP, or RGAP) or market value of net worth (DGAP)?

II. GAP AND SUBSEQUENT PERFORMANCE

If a gap measure contains information for management, investors, or regulators of banks, then there must be some predictable relationship between a gap measure at time t and the behavior of some variable over the period t to t+1. AGAP, WGAP, and RGAP are constructed to focus on the subsequent behavior of interest flows. If market rates of interest are generally rising (falling) over the period t to t+1, a bank with a positive AGAP should experience a rising (falling) net interest income (NII). If AGAP is negative, then NII should be falling (rising) if market rates of interest are rising (falling).

The above statements apply if the other factors affecting NII are constant, which is usually not the case. If the relative amounts of earning assets (EA) or interest bearing liabilities (IBL) are changing during the period, then the resulting NII is also influenced by these

changes. Equation (4) presents the model to be estimated to capture the effects of each of these changes.

$$CNII = a_0 + a_1[AGAP] + a_2[CEA] + a_3[CIBL] + e \qquad (4)$$

where CNII, CEA, and CIBL represent the changes over the period t to t+1 in NII, EA, and IBL. AGAP (or any other gap measure) is measured at the beginning of the period (at t).

Based on the above reasoning, the hypothesized sign for a_1 is positive during periods of rising rates and negative during periods of falling rates. Hypothesized signs for a_2 and a_3 are positive and negative respectively during periods of rising rates, and reversed for periods of falling rates. As earning assets are added to the balance sheet in a period of rising rates, this should give an upward push to interest income; as interest bearing liabilities are added to the balance sheet as rates are rising, interest expense should increase. Movements in the opposite directions would be expected during a period of falling rates.

Finally, if market rates of interest have no discernable pattern over the period, coefficient a_1 should not be significantly different from zero.

Various formulations of gap measures (AGAP, WGAP, and RGAP) can be tested in the framework of equation (4) to determine whether any of these gap measures have information content, or whether any one of the measures is superior to the others.

DGAP, utilizing measures of asset and liability duration, is hypothesized to be related to changes in the market value of a bank's

net worth. Unless market values of assets and liabilities are available this relationship cannot be tested directly. However, it is reasonable to suppose that if DGAP contains information about potential movements in MVNW, investors will make use of that information in their bank stock buying and selling decisions. If investors expect market rates of interest to rise and observe that a bank has a positive (negative) DGAP, they may be willing to buy (sell) the stock, driving its price up (down). If DGAP contains information that is used by the market, then DGAP should have a measurable relationship to market measures of risk for bank stocks.

III. DATA, SAMPLES, AND METHODOLOGY

To test the above hypotheses, various accounting gap measures and a duration gap measure must be calculated. Accounting gaps are constructed using data from Schedule J of the Report of Condition (call report) submitted quarterly by banks to their federal regulators. Quarterly call reports are used for the years 1984 through 1987 (16 quarters). Since performance in the subsequent quarter is the focus, AGAP consists of the difference between all earning asset items and interest bearing liability items with remaining maturity (if fixed rate) or earliest possible repricing interval (if floating rate) of three months or less. These amounts include assets and liabilities with immediately adjustable interest rates or original maturities of one day.

Weighted accounting gaps (WGAP) use the same basic data. Weights are applied to the dollar amounts of RSA and RSL to adjust for their

differing maturities/repricing dates. It is assumed that all assets and liabilities in the over one day but less than three months category have average maturities/repricing of 45 days. That is, in equation (2) t_i and t_j take on the value of 1/360 for immediately adjustable items and 45/360 for items in the over one day to 90 day category. While this is a cruder measure than using individual t values for each asset and liability, data availability forces this approach.

Since regulators appear to include certain non-stated-maturity deposits in the quantity of rate sensitive liabilities, RGAP is constructed by subtracting the dollar amounts of nontransaction savings deposits, MMDAs, and super NOWs from AGAP.

The construction of DGAP is less straightforward and requires a number of assumptions. Asset and liability durations are calculated following the procedure described in French [1988]. To complete the calculation of DGAP as shown in equation (3), book values of total assets and total liabilities are used for A and L respectively. A bank's average earning rate on earning assets and average cost rate on interest bearing liabilities are used as estimates for r_a and r_l.

Net interest income (NII) is adjusted to a before tax equivalent basis and annualized.

Market measures of risk are developed from estimates of b_M and b_I in the two-factor model (see Lynge and Zumwalt [1980] and Giliberto [1988] for previous use of a two factor model for banks) of bank stock returns shown in equation (5):

$$R_j = b_0 + b_M(R_M) + b_I(R_I) \qquad (5)$$

where R_j is the return on bank stock j, R_M is the return on the market, and R_I is an unanticipated change in interest rates.

Equation (5) is estimated using daily return data from the CRSP tapes for 3-month periods. R_M is the equal-weighted return on the market supplied by CRSP. R_I is the daily percentage change in the yield to maturity of a constant maturity 10-year Treasury bond. As argued in Sweeney and Warga [1986] this is interpreted to be an unanticipated change in interest rates.

To test for the information content of DGAP, equation (6) is estimated:

$$b_M = a_0 + a_1(DGAP) \tag{6}$$

In equation (6), DGAP is measured at time t while b_M is estimated for the following three month period. The larger a bank's DGAP, the greater is its exposure to interest rate risk. Based on this reasoning, a_1 should be significantly different from zero if DGAP has information content. If market rates of interest are expected to fall, a bank with a positive DGAP would be expected to experience an increase in its MVNW. To the extent that the market correctly forecasts interest rates, this expectation could lead to a positive value for a_1 when rates are falling and a negative a_1 when rates are rising.

This study uses four samples. The first sample consists of bank holding companies (BHC sample). All bank holding companies with daily return data on the CRSP tape for the period 4-2-84 through 12-31-89 were included; 38 bank holding companies met this criterion. All subsidiary banks owned by each holding company for each of the 16 quarters

were identified. The balance sheet data used to calculate the various gap measures for this sample were aggregated across all subsidiary banks of each bank holding company. This procedure avoids the problems that can develop when data from only the "lead" bank of a holding company are used for balance sheet data.

The other three samples contain banks in three size categories: Large banks with total assets of $300 million or more but without foreign offices (sample size is 114), medium sized banks with total assets of from $100 to $300 million (sample size is 117), and small banks with total assets of under $100 million (sample size is 121). Banks were placed in their respective size categories based on end of year 1987 assets. Banks that were included in the BHC samples were excluded from the latter three samples.

DGAPs are calculated and equation (6) is estimated only for the BHC sample, since stock price data are available only for these large bank holding companies. All accounting gap measures are calculated and equation (4) is estimated for all four samples.

IV. RESULTS

Since some of the hypotheses above are couched in terms of periods of rising, falling, or flat market rates of interest, it is necessary to characterize the movement of interest rates during each of the 15 quarters (from second quarter of 1984 through the fourth quarter of 1987) that are studied. Table 1 presents market interest rate data and the classification chosen for each quarter. Five quarters are

characterized as rising rate quarters, six as falling rate, and the remaining four quarters as flat rate periods.

Duration Gap Results

Equation (5) was estimated for each of the 38 bank holding companies and also for an equal-weighted portfolio of all 38 BHCs for each of the 15 quarters. The portfolio estimates of b_M and b_I are presented in Table 2. Estimates of b_M are consistently statistically significant; estimates of b_I are negative (as expected) but are significant in only three of the 15 quarters. Estimated market betas for individual banks were significant (at the 10% level) in the majority of cases. However, for individual banks, interest rate betas were statistically significant for only a small number of banks. Chen and Chan [1989] conclude that bank stocks demonstrate more interest rate sensitivity during periods of rising rates, which is not characteristic of most of the time period studied here. Even for the five quarters identified as rising rate periods rate increases were much more modest than the decreases in rates during the falling rate quarters. Because of the lack of significance of the interest rate betas, only the market betas will be used in estimating equation (6).

Estimated coefficients for equation (6) are shown in Table 3. In general the results indicate a lack of association between DGAP and bank holding company market betas. Only in the fourth quarter of 1984 is the coefficient significant. The adjusted R-squares are generally negative indicating that DGAP has nothing to add to the constant term in explaining bank market betas. If DGAP does have any information

content, equation (6) is not the specification to demonstrate that content.

The DGAP measure used here is a rather crude measure, relying on many assumed values and book values rather than market values, and therefore may not be a good proxy for the true duration gap that could be calculated if better data were available. However, most banks or analysts would have great difficulty in developing a better proxy. While the concept of duration gap is appealing, estimating it accurately cannot be easily accomplished.

Accounting Gap Results

Equation (4) is estimated for all four bank samples. To conserve space, results are presented only for three samples: the bank holding company sample, the large bank sample, and the small bank sample. Equation (4) is estimated using each of the three accounting measures, AGAP (see Table 4), WGAP (Table 5), and RGAP (Table 6).

In Table 4, for the 38 bank holding company samples, signs of the estimated coefficients for the AGAP variable are generally as hypothesized, positive (negative) during rising (falling) rate quarters. Only six of the 15 coefficients are significantly different from zero at the 10 percent level, and one of these (the quarter ending 8503) has the wrong sign. The signs and significance of the coefficients for CEA (change in earning assets) and CIBL (change in interest bearing liabilities) are quite mixed and frequently not as hypothesized. However these variables play an important role in explaining the change

in net interest income as indicated by the large t-ratios and the adjusted R-squares which are generally high for cross-sectional data.

For the large bank sample the results are similar to the BHC sample with respect to sign, but the number of significant coefficients rises to 14 (out of 15). In addition, adjusted R-squares are higher than for the BHC sample. The three variables in equation (4) are considerably less significant in explaining change in net income for the small bank sample.

Table 5 presents comparable estimates for equation (4) using WGAP (weighted accounting gap) as the gap measure. In general, despite the greater data requirements, WGAP provides no significant increase in explanatory power over the use of AGAP. In Table 6 the result leads to the same conclusion for RGAP (regulator gap), no significant improvement over using AGAP.

Although not one of the three accounting gap measures used here seems to be dominant, all three measures do have some information content. That is, they do bear the hypothesized relationship to subsequent net interest income behavior. However, the nature of this relationship is not particularly stable, especially in its quantitative dimension, and is not always strong. While accounting gap may be useful as a crude indicator of net interest income behavior given the direction of an interest rate change, it is not accurate. Therefore its use as an index for determining interest rate risk management activity is questionable.

V. SUMMARY AND CONCLUSIONS

This paper has examined several measures of balance sheet maturity or repricing composition, gaps, to determine their information content. To have information content a measure should have some systematic or predictable relationship with outcomes in a subsequent period. Three accounting and one duration gap measures were constructed and related to the behavior of net interest income (accounting measures) and systematic risk (duration measure).

Empirical tests were performed quarter by quarter for the 15 quarters beginning with the second quarter of 1984 and ending with the fourth quarter of 1987. Sample data for bank holding companies were used for the duration gap-systematic risk test. DGAP at time t was not a significant explanator of market risk measured over the subsequent three months for these bank holding companies. Three accounting gap measures at time t were related to changes in net interest income in the subsequent quarter for four samples, one sample containing bank holding companies and the other samples containing banks in three different size categories. While the accounting gaps were significantly related to changes in net interest income, the relationships varied at different points in time and among the different samples. The conclusion must be that these gap measures do not possess information that allows meaningfully consistent predictions about subsequent performance.

Although most banks report some variation of these gap measures, and analysts, regulators, and researchers rely on them for a variety of purposes, they seem to have little information content. Why are these gap measures only weakly related to future performance? These

measures are derived from a particular balance sheet position at a single point in time. They lack the ability to accurately describe a myriad of events that unfold as time passes that affect risk and net interest income. Further, gap measures, as defined here, do not contain information about the off-balance sheet positions of banks that may increase or decrease the impacts of movements in market interest rates. This would seem to be the case especially for the large bank holding companies and probably contributes to the weak results for this sample.

Finally, some bank assets and liabilities may be characterized as options. Borrowers have purchased call options giving them the right to pay off their loans prior to the stated maturity. Depositors have purchased put options giving them the right to early withdrawal of their funds. The exercise of these options are dependent on movements in interest rates and can have significant effects on firm performance. The measures examined here do not capture these option-like characteristics.

Where does this leave us? It leaves us without a measure to capture the interest rate risk exposure of a bank, or of any firm. Without such a measure it is impossible to determine the exact dimensions of a hedging or risk management strategy designed to control potential adverse outcomes due to unexpected movements in interest rates.

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TABLE 1

SHORT TERM INTEREST RATES: 1984-1987

QUARTER ENDING	3 MONTH T-BILL RATES: QUARTER BEGINNING	QUARTER END	SUM OF DAILY RATE CHANGES (basis points)	MEAN DAILY RATE CHANGE	CLASSIFICATION OF RATE CHANGE DURING QUARTER
8406	9.68%	9.92%	24	0.375	RISING
8409	9.74	10.22	38	0.594	RISING
8412	10.23	7.85	-231	-3.781	FALLING
8503	7.83	8.18	44	0.698	RISING
8506	8.15	6.83	-136	-2.125	FALLING
8509	6.87	7.04	14	0.219	FLAT
8512	7.03	7.05	11	0.169	FLAT
8603	7.10	6.34	-60	-0.967	FALLING
8606	6.33	5.96	-38	-0.584	FALLING
8609	5.99	5.20	-82	-1.261	FALLING
8612	5.19	5.67	41	0.631	RISING
8703	5.55	5.61	-8	-0.126	FLAT
8706	5.54	5.73	7	0.109	FLAT
8709	5.64	6.61	94	1.446	RISING
8712	6.63	5.68	-102	-1.553	FALLING

The data above are yields from the secondary market on 3-month Treasury bills as reported in "Selected Interest Rates," Release G.13 of the Federal Reserve.

TABLE 2

ESTIMATED BANK BETAS
(38 BHC Sample)

EQUATION 5: $R_j = b_0 + b_M * R_M + b_I * R_I$

QUARTER ENDING	ESTIMATED VALUES FOR BHC PORTFOLIO: b_M	b_I	NUMBER OF INDIVIDUAL BANKS WITH SIGNIFICANT (10% LEVEL) BETA COEFFICIENTS: b_M	b_I
8406	0.9867	-0.0099	31	5
	11.07	0.16		
8409	0.8609	-0.0404	28	3
	10.93	0.52		
8412	0.9438	0.0212	27	4
	11.25	0.38		
8503	0.9170	-0.0870	26	2
	11.79	1.60		
8506	1.0005	-0.0421	21	4
	8.94	1.06		
8509	0.9976	-0.0518	31	4
	11.36	1.06		
8512	0.8452	-0.2190	24	12
	7.29	2.98		
8603	1.3039	-0.0165	30	7
	8.57	0.19		
8606	1.1140	-0.0486	25	3
	11.45	1.41		
8609	1.0368	-0.0849	29	2
	13.07	1.45		
8612	0.9068	-0.0569	27	9
	5.76	0.52		
8703	0.8247	-0.2689	26	5
	8.45	2.68		
8706	1.0193	-0.0176	26	4
	7.43	0.25		
8709	0.8198	-0.1044	21	5
	4.50	0.87		
8712	1.0079	-0.3573	36	16
	21.99	3.70		

Numbers below estimated coefficients are absolute value t-ratios.

TABLE 3
(38 BHC Sample)

EQUATION (6): $b_M = A_0 + A_1 * [DGAP]$

QUARTER ENDING	A_1	ADJUSTED R^2
	RISING RATES	
8406	0.2681	0.031
	1.48	
8409	0.5490	0.039
	1.59	
8503	-0.2341	0.023
	1.37	
8612	-0.1989	-0.016
	0.63	
8709	0.0507	-0.027
	0.20	
	FALLING RATES	
8412	0.3143	0.080
	2.05	
8506	0.0612	-0.027
	0.16	
8603	0.4857	0.002
	1.03	
8606	0.0197	-0.027
	0.20	
8609	0.0461	-0.022
	0.44	
8712	0.2441	-0.015
	0.67	
	FLAT RATES	
8509	0.1797	-0.020
	0.52	
8512	0.2032	-0.021
	0.50	
8703	0.3553	-0.010
	0.81	
8706	-0.0253	-0.027
	0.13	

Numbers below estimated coefficients are absolute value t-ratios.

TABLE 4

EQUATION (4): $CNIITE = A_0 + A_1 * [AGAP] + A_2 * [CTEA] + A_3 * [CTIBL]$

QUARTER ENDING	BHC SAMPLE A_1	A_2	A_3	ADJ R^2	LARGE BANK SAMPLE A_1	A_2	A_3	ADJ R^2	SMALL BANK SAMPLE A_1	A_2	A_3	ADJ R^2
					RISING RATES							
8406	0.0032	0.0109	-0.0029	0.018	0.0074	0.0491	-0.0231	0.208	0.0051	0.0310	-0.0213	0.048
	0.93	1.21	0.32		4.53	2.96	1.24		2.01	2.09	1.18	
8409	0.0060	0.0269	0.0115	0.128	0.0041	0.0944	-0.0650	0.880	0.0095	0.0165	-0.0076	0.199
	1.72	1.77	1.00		4.69	9.87	5.50		4.89	2.18	1.27	
8503	-0.0174	-0.0129	0.1523	0.498	-0.0500	-0.0322	0.1433	0.941	0.0031	0.0703	-0.0557	0.095
	2.80	2.76	4.14		19.47	0.96	3.97		0.94	3.65	2.77	
8612	0.0029	0.0311	-0.0126	0.599	0.0001	0.0618	-0.0656	0.154	-0.0032	0.0137	-0.0018	0.023
	1.43	3.84	1.50		0.04	4.62	4.45		1.56	1.36	0.15	
8709	0.0026	0.0152	0.0118	0.341	0.0031	0.0501	-0.0369	0.362	0.0028	0.0227	-0.0034	0.307
	1.37	1.16	0.75		4.14	6.46	4.75		3.20	4.41	0.62	
					FALLING RATES							
8412	-0.0069	0.0297	-0.0087	0.611	-0.0063	0.0227	-0.0034	0.903	0.0052	0.0045	-0.0119	0.035
	2.81	4.00	0.93		6.92	2.77	0.39		2.60	0.50	1.06	
8506	-0.0040	0.0531	-0.0109	0.431	-0.0064	0.0519	-0.0154	0.926	0.0036	0.0200	-0.0220	-0.006
	1.14	3.00	0.55		9.84	4.89	1.26		1.12	1.02	0.98	
8603	-0.0101	-0.0170	0.0555	0.694	-0.0642	0.0159	0.0428	0.832	0.0008	0.0648	0.0206	0.265
	2.81	1.19	6.72		19.92	0.40	1.01		0.27	5.42	2.03	
8606	-0.0009	-0.0162	0.0306	0.341	0.0479	-0.2528	0.3283	0.709	-0.0018	0.0043	0.011	0.015
	0.32	2.16	3.68		12.15	3.49	3.92		0.98	0.44	0.94	
8609	0.0038	0.0604	-0.0194	0.707	-0.0051	0.0600	-0.0189	0.694	-0.0046	0.0135	-0.0010	0.073
	1.67	5.31	1.55		5.59	4.07	1.18		2.88	1.44	0.11	
8712	-0.0011	0.0242	-0.0232	0.270	-0.0037	0.0316	-0.0249	0.658	-0.0036	0.0109	0.0331	0.721
	0.81	3.93	3.51		6.32	5.48	4.58		2.62	3.64	8.83	
					FLAT RATES							
8509	0.0013	0.0728	-0.0586	0.487	-0.0222	0.0035	-0.0009	0.894	-0.0013	0.0282	-0.0231	0.045
	0.32	4.66	4.54		15.67	0.47	0.09		0.98	2.74	1.87	
8512	0.0026	0.0517	-0.0166	0.701	-0.0119	0.0279	-0.0037	0.904	-0.0020	0.0086	0.0104	0.014
	1.28	5.31	1.54		8.93	4.37	0.51		0.78	0.69	0.67	
8703	-0.0093	-0.0006	0.0186	0.047	0.0011	0.0174	-0.0298	0.112	0.0003	-0.0166	0.0449	0.038
	1.69	0.04	0.94		1.65	2.21	3.60		0.11	1.29	2.69	
8706	-0.0022	-0.0046	0.0221	0.552	0.0076	0.0162	0.0222	0.731	0.0005	0.0064	-0.0003	0.006
	1.27	0.42	1.80		10.21	1.67	1.89		0.39	1.60	0.06	

The gap measure used in this table is AGAP or accounting gap.
Numbers below each estimated coefficient are absolute value t-ratios

TABLE 5

EQUATION (4): $CNIITE = A_0 + A_1 * [WGAP] + A_2 * [CTEA] + A_3 * [CTIBL]$

QUARTER ENDING	BHC SAMPLE A_1	A_2	A_3	ADJ R^2	LARGE BANK SAMPLE A_1	A_2	A_3	ADJ R^2	SMALL BANK SAMPLE A_1	A_2	A_3	ADJ R^2
			RISING RATES				RISING RATES				RISING RATES	
8406	0.0081	0.0108	-0.0073	0.142	0.0064	0.0501	-0.0314	0.157	0.0042	0.0284	-0.0185	0.037
	2.43	1.29	0.83		3.55	2.91	1.64		1.61	1.92	1.03	
8409	0.0077	0.0236	0.0100	0.183	0.0039	0.0091	-0.0718	0.874	0.0112	0.0176	-0.0097	0.272
	2.34	1.80	0.91		3.91	10.30	6.08		6.18	2.45	1.68	
8503	-0.0123	-0.0165	0.1644	0.441	-0.0528	-0.0810	0.2130	0.940	-0.0004	0.0727	-0.0539	0.089
	1.88	2.64	4.24		19.11	2.35	5.33		0.14	3.77	2.66	
8612	0.0034	0.0307	-0.0119	0.601	-0.0014	0.0643	-0.0710	0.164	-0.0033	0.0143	-0.0022	0.029
	1.47	3.80	1.41		1.11	4.85	4.94		1.78	1.42	0.19	
8709	0.0030	0.0161	0.0107	0.351	0.0045	0.0490	-0.0329	0.445	0.0021	0.0223	-0.0027	0.283
	1.55	1.24	0.68		6.01	8.21	5.39		2.45	4.22	0.49	
			FALLING RATES				FALLING RATES				FALLING RATES	
8412	-0.0067	0.0330	-0.0148	0.598	-0.0068	0.0268	-0.0065	0.908	0.0037	0.0049	-0.0111	0.011
	2.57	4.45	1.59		7.54	3.31	0.74		1.93	0.54	0.98	
8506	-0.0072	0.0570	-0.0113	0.480	-0.0064	0.0535	-0.0162	0.920	0.0046	0.0185	-0.0205	0.004
	2.15	3.45	0.62		8.99	4.85	1.28		1.55	0.94	0.92	
8603	-0.0114	-0.0163	0.0565	0.670	-0.0681	-0.0015	0.0553	0.832	0.0015	0.0654	0.0202	0.267
	3.24	1.20	7.03		19.31	0.04	1.26		0.57	5.44	2.00	
8606	0.0006	-0.0151	0.0287	0.340	0.0509	-0.2652	0.3424	0.708	-0.0011	0.0043	0.0106	0.011
	0.21	2.07	3.66		12.14	3.67	4.09		0.66	0.43	0.90	
8609	0.0034	0.0622	-0.0211	0.701	-0.0053	0.0606	-0.0186	0.683	-0.0035	0.0121	-0.0005	0.050
	1.43	5.51	1.69		5.18	3.95	1.11		2.29	1.28	0.05	
8712	-0.0010	0.0245	-0.0232	0.266	-0.0034	0.0325	-0.0223	0.655	-0.0033	0.0107	0.0331	0.719
	0.68	3.97	3.48		6.21	5.62	4.12		2.43	3.57	8.78	
			FLAT RATES				FLAT RATES				FLAT RATES	
8509	0.0028	0.0698	-0.0559	0.496	-0.0244	0.0016	0.0065	0.887	-0.0009	0.0280	-0.0233	0.042
	0.85	4.89	4.78		14.92	0.20	0.63		0.75	2.71	1.88	
8512	0.0021	0.0509	-0.0156	0.696	-0.0123	0.0276	-0.0014	0.907	-0.0008	0.0078	0.0107	0.010
	1.06	5.19	1.43		9.23	4.40	0.20		0.34	0.62	0.69	
8703	-0.0107	-0.0032	0.0197	0.067	0.0014	0.0177	-0.0312	0.110	-0.0005	-0.0174	0.0456	0.038
	1.91	0.18	1.01		1.57	2.23	3.75		0.22	1.35	2.74	
8706	-0.0022	-0.0033	0.0207	0.553	0.0084	-0.0004	0.0429	0.728	-0.0002	0.0063	0.0002	0.005
	1.28	0.31	1.78		10.11	0.04	3.80		0.16	1.58	0.05	

The gap measure used in this table is WGAP -

TABLE 6

EQUATION (4): $CNIITE = A_0 + A_1 * [RGAP] + A_2 * [CTEA] + A_3 * [CTIBL]$

QUARTER ENDING	BHC SAMPLE A_1	A_2	A_3	ADJ R^2	LARGE BANK SAMPLE A_1	A_2	A_3	ADJ R^2	SMALL BANK SAMPLE A_1	A_2	A_3	ADJ R^2
					RISING RATES							
8406	-0.0085	0.0150	-0.0082	0.332	0.0037	0.0467	-0.0307	0.092	0.0062	0.0268	-0.0140	0.075
	4.16	2.01	1.07		1.96	2.59	1.54		2.75	1.85	0.80	
8409	-0.0039	0.0092	0.0119	0.121	0.0037	0.0905	-0.0599	0.876	0.0029	0.0203	-0.0068	0.056
	1.63	0.71	1.04		4.17	8.73	4.60		1.64	2.48	1.05	
8503	-0.0125	-0.0472	0.1012	0.500	-0.0541	0.0104	0.0385	0.937	0.0050	0.0720	-0.0557	0.110
	2.83	1.21	2.40		18.49	0.30	1.00		1.66	3.79	2.80	
8612	0.0019	0.0352	-0.0174	0.585	-0.0007	0.0617	-0.0677	0.158	-0.0016	0.0120	-0.0043	0.009
	0.91	3.64	1.79		0.71	4.70	4.88		0.84	1.19	0.36	
8709	0.0009	0.0116	0.0165	0.310	0.0008	0.0301	-0.0194	0.272	-0.0007	0.0176	0.0010	0.250
	0.50	0.86	1.05		1.26	4.48	2.79		0.77	3.27	0.17	
					FALLING RATES							
8412	-0.0032	0.0243	-0.0004	0.543	-0.0066	0.0081	0.0082	0.897	0.0014	0.0056	-0.0090	-0.015
	1.31	2.28	0.03		6.19	0.99	0.95		0.85	0.61	0.79	
8506	0.0109	0.0967	-0.0353	0.633	-0.0077	0.0416	-0.0124	0.938	-0.0071	0.0128	-0.0115	0.022
	4.56	5.92	2.26		11.65	4.24	1.12		2.15	0.65	0.51	
8603	-0.0108	0.0112	0.0320	0.689	-0.0570	0.1636	-0.1298	0.896	-0.0019	0.0645	0.0197	0.267
	3.64	0.84	3.45		26.48	5.57	4.25		0.60	5.41	1.91	
0606	-0.0003	-0.0168	0.0305	0.339	0.0499	-0.0935	0.2889	0.632	-0.0032	0.0020	0.0123	0.031
	0.12	1.47	2.48		9.83	1.05	3.07		1.69	0.20	1.06	
8609	-0.0026	0.0683	-0.0295	0.700	-0.0054	0.0605	-0.0304	0.720	-0.0055	0.0093	0.0003	0.096
	1.38	6.03	2.41		6.63	4.53	2.19		3.40	1.03	0.03	
8712	-0.0036	0.0118	-0.0118	0.436	-0.0037	0.0312	-0.0253	0.641	-0.0024	0.0103	0.0323	0.714
	3.30	1.78	1.79		5.77	5.28	4.53		2.01	3.40	8.57	
					FLAT RATES							
8509	-0.0061	0.0720	-0.0633	0.576	-0.0194	0.0004	-0.0061	0.952	-0.0037	0.0251	-0.0224	0.107
	2.71	6.25	6.96		25.71	0.09	1.00		3.02	2.51	1.90	
8512	-0.0048	0.0445	-0.0104	0.774	-0.0170	0.0297	-0.0177	0.922	-0.0072	0.0105	0.0090	0.065
	3.63	5.14	1.09		11.03	5.18	2.51		2.66	0.86	0.60	
8703	0.0017	-0.0077	0.0257	-0.030	-0.0001	0.0143	-0.0303	0.090	-0.0041	-0.0179	0.0413	0.060
	0.30	0.36	1.20		0.11	1.83	3.59		1.67	1.43	2.50	
8706	0.0010	0.0055	0.0104	0.538	0.0083	0.0450	-0.0091	0.779	-0.0028	0.0030	0.0029	0.045
	0.71	0.54	0.92		12.29	4.67	0.78		2.10	0.70	0.61	

The gap measure used in this table is RGAP or regulatory gap.
Numbers below each estimated coefficient are absolute value t-ratios.